STS-103 Preflight Readiness Review (FRR) Minutes

A special STS-103 PFRR convened at 1 p.m. on Tuesday, November 2, 1999, in Building 1, Room 966, at the Johnson Space Center (JSC) to discuss the resolution of an STS-93 In-flight Anomaly (IFA). The IFA was an AC BUS short which occurred 6 seconds after liftoff. This review focused on a program assessment of wiring including inspecting protection repairs, testing, and overall status on the health of wiring in all hardware components. The meeting was chaired by George W. S. Abbey, Space Shuttle Program Lead Center Director.

The pre-FRR presenters were: Space Shuttle Customer and Flight Integration - R. Swalin (NASA/JSC/MT); EVA - K. Lewis (NASA/JSC/ER6), B. Higgins (HSSSI/CN/1A-2-X65); ET - L. Colon (LMMSS/MAF/4120); SSME - A. Hill (Boeing-Rocketdyne/Canoga Park/CB44); RSRM - J. Edwards (Thiokol/Utah/L00); SRB - R. Elliott (USA/KSC/USK-417); Launch and Landing - R. Herman (USA/KSC/USK-321); Program Integration - R. Fisher II (USA/JSC/USH-700D); and Vehicle Engineering - R. Anderson (NASA/JSC/MV5), R. Allison (NASA/JSC/MV6), D. White (USA/JSC/USH-601M).

SHUTTLE PAYLOAD CUSTOMER & FLIGHT INTEGRATION

The PRCB action directing a wire status of the major reflown payloads is forthcoming. To date, the payload community has not identified the need for any unique tests specific to the wire inspection activity.

EXTRAVEHICULAR ACTIVITY (EVA)

Simplified Aid for EVA Rescue (SAFER)

Potential problems with the use of Teflon wiring in this application were discussed. More data from the outside community concerning this issue will be gathered and reviewed.

The SAFER is ready to support all future flights.

Extravehicular Mobility Unit (EMU) Harnesses

A fleet leader evaluation has been performed, and no problems have been found. The EMU is ready to provide continued support to STS-103 and the Space Shuttle Program.

EXTERNAL TANK (ET)

The scope of the ET electrical harness evaluation was presented. A good inspection program is in place. ET harness design, fabrication and installation present no constraint to STS-103.

SPACE SHUTTLE MAIN ENGINE (SSME)

An issue of the life-cycle of the wiring harnesses was discussed. A fleet leader program is in place to address the aging issue.

A discussion ensued regarding fluid exposure. It was stated that all connections are re-inspected after clean-up when any spills occur during processing. No constraints to flight were identified.

REUSABLE SOLID ROCKET MOTOR (RSRM)

During a discussion of verifying interfaces, it was stated that testing is performed on the cables/wires at several points during the processing flow.

The RSRM is ready for flight.

SOLID ROCKET BOOSTER (SRB)

Extensive inspection and check-out of the SRB cables has been performed. Due to the fact that some of the cables are reusable, a new inspection process will include tear-down of fleet leader cables to inspect for wear/aging. There are no constraints to flight.

GROUND-SUPPORT EQUIPMENT (GSE) - KSC SHUTTLE PROCESSING

As a result of the current wiring inspections, corrective actions will be taken to refurbish several hundred connectors in the Payloads System wiring and cables at both Pads. No constraints to flight were identified.

PAYLOAD INTEGRATION

During a discussion of the Problem Report (PR) trend analysis completed by Payload Integration, concerns were expressed regarding the high number of PR's taken on STS-99 hardware. It was noted that the statistic shown was not normalized for hardware quantities; however, this issue will be reviewed and statused in a subsequent meeting.

A concern was raised during a discussion of Payload Bay (PLB) wiring, wherein no particular document could be identified as the driver for wrapping payload harnesses to prevent chafing. An action was assigned directing a full description of the installation of PLB harnesses.

WALK-ON: SPACECRAFT WIRE INSULATION SYSTEMS

The advantages, disadvantages, and applications of Teflon, Kapton, Tefzel, and hybrids (in regard to spacecraft wire insulation) were presented.

VEHICLE ENGINEERING

Flight Crew Equipment

All Flight Crew equipment wiring has been changed to Teflon. No constraints to flight were identified.

Shuttle Remote Manipulator System (SRMS)

There were no constraints to flight identified.

Orbiter

A fleet wire inspection and repair summary was given. Detailed discussions were held on potential arc tracking, potential chafing areas, Criticality 1 wiring, testing versus intrusive inspections, wire protection, specific test results, damage found with fanning of wires, and rationale for flight.

The procedures followed when spills occur were summarized. There were no spills which involved contact with wiring during the OV-103 flow.

OV-103 is acceptable for rollout/flight.

ACTION ITEM SUMMARY

There were four PRCB action items assigned on S060341R4.

STS-103 FRR Minutes

The STS-103 FRR convened at 8:30 a.m. on Friday, November 19, 1999, in the Mission Briefing Room, at the Kennedy Space Center (KSC). The meeting was chaired by George W. S. Abbey, Space Shuttle Program Lead Center Director.

Flight Crew and Ferry Readiness did not have any issues or constraints to flight and did not make formal presentations. Readiness statements submitted were included in the backup package.

The STS-103 FRR presenters were: Mission Summary - L. Ham (NASA/JSC/DA8); Program Integration - W. Gerstenmaier (NASA/JSC/MA2), J. Campbell (NASA/GSFC/440.0), G. Nelson (Independent Readiness Review), R. White (USA/JSC/USH-700C), R. Wallace (NASA/JSC/MS4); Payload Processing - S. Ernest (NASA/KSC/NN-H); External Tank - P. Counts (NASA/MSFC/MP31), R. Wetmore (LMMSS/KSC/MMC-1); RSRM - J. Edwards (Thiokol/Utah/L00); SRB - R. Elliott (USBI/KSC/USB-EN); SSME - D. Adamski (Boeing-Rocketdyne/Canoga Park/55-AB88); Vehicle Engineering - D. White (USA/JSC/USH-601M), T. Peterson (USA/JSC/USH-631A), B. Werner (Boeing/Huntington Beach/AD56), T. Reith (Boeing/JSC/ZC01), S. V. Murray

(NASA/JSC/EV), S. Walker (NASA/JSC/EC5), G. Davis (USA/JSC/USH-620A); EVA - C. Seaman (NASA/JSC/XA), G. A. Flynt (NASA/JSC/XA); Launch and Landing - J. Vevera (USA/KSC/USK-229), R. Millang (USA/KSC/USK-459), T. Herst (NASA/KSC/PK-D), S. Altemus (NASA/KSC/PZ-L), J. Wilder (USA/KSC/USK-383), D. King (NASA/KSC/PH); Mission Operations - J. Bantle (NASA/JSC/DA8), G. Morse (NASA/GSFC/E203), C. Knarr (USA/JSC/USH-400A); Space and Life Sciences - D. Williams (NASA/JSC/SA); Logistics - C. Murphy (USA/KSC/USK-C59); Range - J. Madura (45RANS/PAFB/DOS), M. Gauel (45RANS/PAFB/DOS); DDMS - T. Friers (45RANS/PAFB/DDMS); and SR&QA - M. Erminger (NASA/JSC/MQ).

MISSION SUMMARY

The STS-103 Flight Readiness Review opened with Mission Operations Directorate presenting a Mission Overview; including the flight design summary, payload bay configuration, personnel, timeline, mission priorities and a special topic of Rendezvous/Grapple of Hubble Space Telescope (HST) in Hardware Sunpoint or Zero Gyro Sunpoint.

PROGRAM INTEGRATION

The status, open work, and effect on the Extra Vehicular Activity (EVA) timeline as a result of the recent HST Rate Sensor Unit (RSU) failure was briefed. A failure review board is determining if the RSU failure is actually the RSU, Electronics Control Unit (ECU) or elsewhere. EVA time to replace the ECU is under review.

The HST solar array slew that occurred during external airlock depressurization during STS-82 was discussed with respect to corrective actions taken for STS-103. There are no issues expected for STS-103.

Non Compliance Reports (NCR), Launch Commit Criteria (LCC) updates and the Mission Director Summary were presented. Program Integration is ready for flight pending completion of the defined open work.

PAYLOAD PROCESSING

Payload processing status and scrub turnaround planning were presented. One Certificate of Flight Readiness (CoFR) Exception (001) was logged for Payload HST documentation disposition. The STS-103 Payload team is ready for launch.

EXTERNAL TANK (ET)

ET-101 highlights include the fourth ET to fly with Solid Rocket Booster (SRB) camera coverage. Two processing anomalies were identified: ET/SRB Cross Strap Harness Failure and ET-106 Gaseous Oxygen (GO2) 2-inch Disconnect Bent Poppet Stem Missing Chrome Plating. LH2 tank changes for Space Shuttle Main Engine (SSME) Block II implementation were reviewed. Increased inter tank foam venting and two special topics, (1) Weld Instruction Card (WIC) Certification and (2) Heat Treat of Flexible Ball Joint, were presented. ET-101 is ready for STS-103 flight.

REUSABLE SOLID ROCKET MOTOR (RSRM)

Changes since previous flight included two class 1 engineering changes (RSRM Block Model Update & Propellant Burn Rate Scale Factor Update), three critical process changes (grit blast system and media replacement in the insulation and component work center, spray in air cleaning of flight hardware, and adhesive premixing conditioning time), three non critical process changes, and four Operations and Maintenance Requirements and Specifications Document (OMRSD) changes to extend age-life limit for RSRM hardware.

A Senior Material Review Board (SMRB) nonconformance was presented for left hand and right hand Hydroxyl Butadiene (HB) polymer. Suspect condition was contamination in the HB polymer constituent. Two small pieces of polyethylene were found after HB polymer delivery off load. Additional filtering was performed with a 20-mesh screen. The 20-mesh screen will retain contaminants greater than 0.25 inches in length. Engineering analysis of contaminants up to 0.4 inches in length show either no effect or positive margin for propellant structural properties, ballistics, thermal protection, and nozzle impact.

Three technical issues/special topics were presented:

1. Misidentified failure mode nozzle joint 2 - Review of the Failure Mode Effects Analysis/Critical Items List (FMEA/CIL) document determined that one leak path through RSRM nozzle joint 2 had not been properly identified. Postflight inspections, testing, and analysis confirm that failure of the leak check port plug seal would not result in loss of flight or mission.

2. Left hand/right hand Aft Exit Cone (AEC) shipping temperature excursions – Temperature data during transport to KSC via rail car violates established flag criteria. Temperature exposure is in family of STS-89 and STS-97. Structural analysis predicts no bond failures. Through in-family experience and analysis the temperature excursions are not a constraint to STS-103.

3. Field joint heater performance – During field joint heater checkout the delta between sensors exceeded the OMRSD maximum of 12 degrees F. Performance of each heater has been characterized, LCC deviation completed, Operations Maintenance Instruction (OMI) deviation completed, OMRSD waiver for heater variation is complete. The joint seal temperature will remain within the certified range. RSRM hardware is ready to support STS-103.

SPACE SHUTTLE MAIN ENGINE (SSME)

Major components and engine performance were reviewed. Special topics included: Main injector deactivation pin expulsion STS-93 Inflight Anomaly (IFA); STS-93 AC power anomaly; High Pressure Fuel Turbo Pump (HPFTP) first-stage turbine fir tree cracks; and High Pressure Oxygen Turbo Pump (HPOTP)/ Advanced Turbopump (AT) Eddy Current Inspection master calibration.

A walk-on item - a newly discovered leak in the Low Pressure Oxygen Turbo Pump (LPOTP) speed sensor seal of engine 2049 was discussed. Sealing of the leak will be attempted one more time. If the leak continues, the pump will be replaced at the Pad. Two CoFR Exceptions (003, 004) were logged for SSME. Pending completion of open issues, SSME is ready to support STS-103.

SOLID ROCKET BOOSTER (SRB)

STS-93 post flight assessment reviewed the Right Hand tilt hydraulic pressure measurement IFA. The anomaly was attributed to an intermittent open circuit on one Amplifier Buffer Attenuator (ABA) card edge connector contact. This was an isolated case (first occurrence). The connector contact type is restricted to data circuits (criticality 3 measurements). There is no effect on the Thrust Vector Control (TVC) system during flight.

Two special topics were presented (1) Booster Separation Motor (BSM) Liner soft spots, and (2) Hydraulic pump torsion spring not properly seated in hanger.

One CoFR Exception (002) was submitted. SRB has no constraints to STS-103.

VEHICLE ENGINEERING

Critical process changes presented included (1) Orbiter Maneuvering System (OMS) tank repair certification for White Sands Test Facility (WSTF), (2) Acceptance Test Procedure (ATP) for Radiator panel leak test, (3) Radiator panel doubler material callout correction and cleaning note addition, (4) Radiator panel cleaning process specification addition, (5) Negative pressure relief valve ATP, (6) Boeing specification, MT0501-514 Rev E, requirements for inspections of Orbiter windows, and (7) Material review disposition.

Configuration changes consist of 16 modifications incorporated during STS-103 processing. Nine modifications were noted as flying for the first time. Three modifications; Airlock venting mod, Advanced air data transducer, and Light weight lockers were presented.

Special topics presented included (1) Fleet wire inspection and repair status; (2) Nose landing gear lockbrace bungee bellcrank assembly; (3) Panel C3 main engine shutdown switch decal issue; (4) Reaction Control System (RCS) manifold 5 oxidizer isolation valve; and (5) Main Propulsion System (MPS) GO2 ET/Orbiter 2-inch disconnect.

Two actions, 103-FRR-002 and 103-FRR-003, were assigned to Vehicle Engineering dealing with connector cables moisture exposure and validation of the wire inspection process on OV-102.

Software readiness and the emergency oxygen system activation investigation were reviewed. Pending completion of scheduled open work, the orbiter vehicle, support hardware, flight crew equipment, and software are ready to support STS-103.

Concerns over differences between source documentation/drawings, hardware labels, crew procedures, and other identification problems prompted issuance of Action Item 103-FRR-004 to the International Space Station (ISS) Program. This Action Item is due prior to ISS mission 2A.2 and does not affect nor constrain STS-103.

EVA

The objectives of this HST repair and maintenance mission were presented. Each EVA planned for the mission was presented. CoFR Exception (006) on a 55-foot safety tether was issued. This Exception is scheduled for closure by the STS-103 Prelaunch Mission Management Team (PMMT) review. The EVA Project Office is ready to support STS-103.

LAUNCH AND LANDING

An updated schedule of the work remaining was presented. There are no issues with OMRSD, Ground Launch Sequencer (GLS) or Unexplained Anomalies (UA's). The new control system for the Liquid Oxygen (LOX) pumps and the ET/SRB Cross Strap Cable Failure were presented. Final cleaning of the Payload Bay, lost tools, missing items and ongoing activities to locate or resolve these issues was also presented. CoFR Exception (001) on Payload and HST was taken. Also Action Item 103-FRR-005, dealing with the status of the mission ¼" rachet, was issued. The Action Item completion is due by the STS-103 PMMT review.

Another topic presented was the LCC, particularly as it relates to the Hazardous Gas Monitoring System. NASA management activities for launch and landing were presented. Pending completion of planned and scheduled open work, Launch and Landing is ready for STS-103.

MISSION OPERATIONS DIRECTORATE (MOD)

The significant mission "Firsts," Integrated NASA Network support and Significant Changes were presented by Goddard Space Flight Center (GSFC). USA Flight Operations discussed Mission Control Center (MCC) support plans and activities for STS and HST. CoFR Exception (005) on Flight Software was taken. The Flight Director's Office discussed significant mission items, reviewed Flight Rules and presented Ascent Performance, Abort Regions, ET impact area, HST rendezvous, and significant open work.

Action Items 103-FRR-001 and 103-FRR-00, dealing with open work on HST mission planning and resolution of POCC commanding problems, were issued. Actions must be closed by the STS-103 PMMT review. MOD has no other issues and will be ready to support STS-103.

SPACE and LIFE SCIENCES

Space and Life Sciences Directorate has no issues and is ready to support STS-103.

LOGISTICS

The status of hardware being refurbished at the NASA Shuttle Logistics Depot (NSLD) was presented. Logistics has no issues and is ready to proceed with STS-103.

RANGE

Information on the replacement of the weather buoy damaged by Hurricane Floyd was presented. The Eastern Range and the Department of Defense (DOD) Shuttle Network have no issues and are ready to support STS-103.

SPACE SHUTTLE SR&QA

Significant assessments were presented along with revisions to one Hazard Analysis and three FMEA/CIL's. With satisfactory completion of identified open work, the SR&QA community has no constraints to STS-103.

READINESS POLL

Mr. Abbey conducted a readiness poll of all elements and the review board members for a go-no go. All elements and members responded as being "go;" with the exception of successful completion of the open work presented during the review.

Further, Mr. Abbey requested a Delta Flight Readiness Review to be conducted prior to the PMMT review.

The Flight Readiness Review meeting was adjourned at approximately 7 p.m.

ACTION ITEMS/EXCEPTIONS

There were six Action Items assigned. Six CoFR Exceptions were submitted.

STS-103 Delta FRR Minutes

The STS-103 DFRR convened at 2 p.m. on Wednesday, December 1, 1999. The meeting was chaired by George W. S. Abbey, Space Shuttle Program Lead Center Director, from White Sands and conducted via telecon to NASA-Headquarters, NASA-JSC, NASA-MSFC, NASA-Stennis, NASA-Goddard, USA-JSC, Boeing-Huntington Beach, Thiokol-Utah, LMMSS-New Orleans, Rocketdyne-Canoga Park, and Hamilton Sundstrand-Connecticut.

The STS-103 DFRR presenters were: Program Integration - J. Campbell (NASA/GSFC/440.0), L. Ham (NASA/JSC/DA8), D. Holt (NASA/JSC/MA2); Payload Processing - S. Francois (NASA/KSC/BQ); SRB - M. Rudolphi (NASA/MSFC/EE11); SSME - D. Adamski (Boeing-Rocketdyne/Canoga Park/55-AB88); Vehicle Engineering - D. White (USA/JSC/USH-601M), P. Thornton (USA/JSC/USH-632L); EVA - C. Seaman (NASA/JSC/XA); Launch and Landing - D. Thompson (USA/KSC/USK-229),

R. Millang (USA/KSC/USK-459), C. Curtis (USA/KSC/USK-507), D. King (NASA/KSC/PH); RSRM - J. Edwards (Thiokol/Utah/L00); Mission Operations - C. Knarr (USA/JSC/USH-400A), L. Ham (NASA/JSC/DA8); and SR&QA - M. Erminger (NASA/JSC/MQ).

PROGRAM INTEGRATION

Open work identified during the November 19 FRR was statused. This open work included discussions on:

- Zero Gyro Sun Point (ZGSP) attitude excursions – work is continuing to develop an attitude excursion predictive capability before launch

- Mission operations planned training for both Hubble Space Telescope (HST) control modes – Training is scheduled prior to STS-103 PMMT

- Space Telescope Operations Control Center prelaunch test of Hardware Sun Point (HWSP) with retrieval modes gyros in control – Test is rescheduled for December 3, due to Spacecraft power control unit relay failure

- HST ground command plan – The command plan has been updated for rendezvous and grapple under HWSP. A pre-existing plan for rendezvous and grapple under ZGSP is ready if required

- Update EVA plan/timeline to include Electronics Control Unit (ECU) changeout – The Gyro #1 failure review board reported the most likely cause of the failure was the gyro Rate Sensor Unit currently planned in the EVA timeline

MOD continued with discussions of additional crew training runs with HST in both control modes. Eleven SES sessions complete prior to 11/19/99 FRR. Five runs were based on HST in ZGSP with high HST rates. Two additional SES sessions were completed since the FRR. The crew successfully grappled. The plan to rendezvous and grapple under HWSP was discussed.

Changes since FRR included the additional HST ECU stowed and Orbiter Ku Band reflected radiation risk avoidance.

The External Independent Readiness Review (EIRR) assessment was briefed. HST servicing mission 3A is ready to fly.

PAYLOAD PROCESSING

The disposition of the lost and found problem reports was discussed. HST customer is satisfied with the efforts made to find lost items. No impact to mission success.

SPACE SHUTTLE MAIN ENGINE (SSME)

High Pressure Fuel Turbine Pump (HPFTP) blade cracks, HPFTP main housing undersized wall thickness and Large Throat MCC (LTMCC) plating process change were presented. The LTMCC plating process change has the potential to negatively impact weldability. There is a possible impact to STS-99 engines. The MSFC Fracture Control Board has cleared STS-103 engines for this flight only.

VEHICLE ENGINEERING

FRR action items relating to wiring inspection during Orbiter Maintenance Down Period (OMDP); and the determination of whether any regularly flexed cables have been exposed to moisture, were discussed. The results of the inspection of the flight deck and middeck panel decals as compared to installation drawings were briefed.

The CoFR Exception, 103-FRR-005, HST command software patch was discussed. The software patch was generated, verified and released on 11/24/99. SAIL testing and analysis was completed on 11/30/99. Flight software is ready to fly.

EXTRA VEHICULAR ACTIVITY (EVA)

The 55-foot safety tether reels broken retraction spring investigation results were briefed. STS-103 tether reels have passed acceptance tests. The crew has been briefed on avoiding uncontrolled tether retractions. STS-103 CoFR Exception #6 was recommended for closure. EVA Project Office certifies that there are no constraints to the launch of the STS-103 Mission.

LAUNCH AND LANDING

Integrated operations summary detailing the current status of operational activities was presented. The findings of the review and investigation of the lost and found problem reports were briefed. Contaminated wipers used on flight hardware was presented. No processing anomalies have been detected during flight hardware processing as a result of the contaminated wipers.

REUSABLE SOLID ROCKET MOTOR (RSRM)

Potential for contamination on RSRM sealing and bonding surfaces due to use of contaminated wipers was presented. The areas of concern for RSRM include (1) forward aft skirt joint, (2) electrical cabling and connectors, (3) instrumentation compatibility and grounding, (4) propellant and inhibitor, (5) nozzle joint #1, (6) aft skirt joint, (7) stiffener ring, (8) field joint, and (9) the S&A device. Bonding and compatibility testing with RSRM materials from these areas is in process and will be statused at the STS-103 PMMT.

MISSION OPERATIONS DIRECTORATE (MOD)

The status of the analysis into Mission Control Center (MCC) Power Distribution Units (PDU) tripping and causing loss of power was briefed. MCC sluggish Payload Operations Control Center (POCC) throughput commanding was discussed. MCC POCC command sent twice/two stage command failure fix and testing and coordination with GSFC were statused.

SAFETY, RELIABILITY & QUALITY ASSURANCE (SR&QA)

With the satisfactory completion of identified open work, SR&QA has no constraints to STS-103.

Mr. McMonagle summarized the final resolution of the issues and actions to be presented at the Prelaunch Mission Management Team (PMMT) review now scheduled for December 9, 1999. These are:

- Program Integration will present the Zero-Gyro Sun Point attitude control issue. The results of the testing scheduled for December 3, 1999, on the Space Telescope Operations Control Center prelaunch test of the Hardware Sun Point with Retrieval Mode Gyros in control. Finally, review of the HST second ECU replacement plan.

- RSRM Project will present the Low Lint Cloth Wiper issue as it relates to bonding and compatibility testing with RSRM materials.

- SSME Project will present the HPFTP main housing undersized wall thickness and final results of the Fracture Control board evaluation of the Large Throat MCC weld cracks.

- Vehicle Engineering will present the results of the OV-102 wire inspections at Palmdale to validate the inspection assumptions used at KSC for OV-103 and OV-105.

- Launch and Landing will present a final summary of the issue of contaminated wipes used on flight hardware.

- Mission Operations Directorate will present the results of simulation testing to correct the Two Stage Command failure.

READINESS POLL

Mr. Abbey's poll of all elements and FRR members indicated that upon completion of all open work and satisfactory closure of open issues at the PMMT review, STS-103 is ready for flight.

ACTION ITEMS/EXCEPTIONS

There were three Action Items assigned.

Donald R. McMonagle
Manager, Launch Integration

6 Enclosures:
1. Agendas (3)
2. Action Item Logs (2)
3. Exception Log

STS-103
Preflight Readiness Review
Subject: Wiring Issue
November 2, 1999

Agenda

Welcome	Manager, Space Shuttle Program
Overview	Manager, Launch Integration
Shuttle Payload Customer & Flight Integration	Manager, Space Shuttle Customer and Flight Integration
EVA	Manager, EVA Project
External Tank	Manager, External Tank Project
SSME	Manager, Space Shuttle Main Engine Project
RSRM	Manager, Reusable Solid Rocket Motor Project
SRB	Manager, Solid Rocket Booster Project APM, SRB Element, SFOC
GSE (KSC Shuttle Processing)	Director of Shuttle Processing APM, Ground Operations, SFOC
Payload Integration	Manager, Space Shuttle Systems Integration APM, Program Integration, SFOC
Flight Crew Equipment	Manager, Space Shuttle Vehicle Engineering
SRMS	Manager, Space Shuttle Vehicle Engineering
Orbiter (JSC)	Manager, Space Shuttle Vehicle Engineering APM, Orbiter Element, SFOC
SR&QA	Manager, Safety, Reliability and Quality Assurance
Action Item Summaries	Manager, Launch Integration

STS-103
Flight Readiness Review
November 19, 1999

Agenda

Introduction	Manager, Launch Integration
	Program Manager, SFOC
Mission Summary	Flight Director, Mission Operations
Program Integration	Flight Manager
	Manager, Space Shuttle KSC Integration
	Manager, Space Shuttle Systems Integration
	Manager, Space Shuttle Customer and Flight Integration
	APM, Program Integration, SFOC
Payload Processing	Director of Space Station and Shuttle Payloads
External Tank	Manager, External Tank Project
RSRM	Manager, Reusable Solid Rocket Motor Project
SRB	Manager, Solid Rocket Booster Project
	APM, SRB Element, SFOC
SSME	Manager, Space Shuttle Main Engine Project
Vehicle Engineering	Manager, Space Shuttle Vehicle Engineering
	APM, Orbiter Element, SFOC
	APM, Flight Software, SFOC
	APM, FCE/EVA, SFOC
EVA	Manager, EVA Project
Launch and Landing	Director of Shuttle Processing
	APM, Ground Operations, SFOC
Mission Operations	Director, Mission Operations
	APM, Flight Operations, SFOC
Flight Crew	Director, Flight Crew Operations
Space and Life Sciences	Director, Space and Life Sciences
Ferry Readiness	Ferry Operations Manager
Logistics	Director of Logistics Operations
	APM, Integrated Logistics, SFOC
Range	United States Air Force
DDMS	Director, DDMS
SR&QA	Manager, Safety, Reliability and Quality Assurance
Project/Exception/ Action Item Summaries	Manager, Launch Integration
Readiness Poll	Director, Space Shuttle and International Space Station Programs
	Lead Center

STS-103
Delta Flight Readiness Review
December 1, 1999
1400 - 1700 EST

Agenda

Introduction	Manager, Launch Integration
Program Integration	ZGSP Attitude Excursion Analysis
Payload Processing	Exception 103-FRR-001 Processing Documentation Dispositioned
RSRM	Low Lint Cloth Problem Report
SRB	Exception 103-FRR-002 Hydraulic Pump Spring Retainers Certification
SSME	Exception 103-FRR-003 HPFTP Turbine Blade Crack UCR Exception 103-FRR-004 HPFTP Main Housing Backplate Wall MR SSME 2049 MCC Weld Fracture Control Board Disposition
Vehicle Engineering	Action 103-FRR 002 Connector Cables Moisture Exposure Action 103-FRR-003 Validation of Wire Inspection Process on OV-102 Exception 103-FRR-005 HST Command Software Patch
EVA	Exception 103-FRR-006 Safety Tether Spring Failure Investigation
Launch and Landing	Action 103-FRR-005 Status of Missing ¼" Ratchet and Resolution of any Payload Concerns Exception 103-FRR-001 Lost and Found Dispositioned MLI Buttons
Mission Operations	Action 103-FRR-001 Open Work on HST Mission Planning Action 103-FRR-006 Resolution/Workaround of POCC Commanding Problems
Logistics	Logistics Trace on Low Lint Cloth Use
SR&QA	Manager, Safety, Reliability and Quality Assurance
Action Item Summaries	Manager, Launch Integration
Readiness Poll	Director, Space Shuttle and International Space Station Programs Lead Center

STS-103
FLIGHT READINESS REVIEW
November 19, 1999
ACTION ITEM LOG

CONTROL NO.	ASSIGNEE(S)	ACTION	C	DUE DATE	CLOSURE DATE
103-FRR-001	MOD	STATUS OPEN WORK AS REPORTED ON PAGE 26 OF FRR MISSION SUMMARY PRESENTATION: ZGSP ATTITUDE EXCURSIONS, CREW TRAINING, SOFTWARE PATCH VALIDATION, TEST OF HWSP WITH RETRIEVAL MODE GYROS IN CONTROL, HST GROUND COMMAND PLAN, EVA PLAN/TIMELINE.		STS-103 PMMT	
103-FRR-002	VEHICLE ENGINEERING	DETERMINE WHETHER ANY OF THE CONNECTOR CABLES THAT ARE REGULARLY FLEXED AS PART OF STANDARD OPERATIONS HAVE BEEN EXPOSED TO MOISTURE, EITHER INADVERTENTLY OR BY EXPOSURE TO WEATHER.		STS-103 PMMT	
103-FRR-003	VEHICLE ENGINEERING	DEVELOP PLAN TO ESTABLISH CONFIDENCE IN WIRE INSPECTION PROCESS WHILE INSPECTING OV-102 (DURING OMDP). REPORT RESULTS AT THE STS-103 PMMT.		STS-103 PMMT	
103-FRR-004	ISS	VERIFY ALL ISS SOURCE DOCUMENTATION/DRAWINGS ARE UNDER CONFIGURATION CONTROL AND PROPERLY "FLOWED DOWN" TO HARDWARE LABELS, SYSTEMS HANDBLOCKS, CREW PROCEDURES, ETC.		ISS MISSION 2A.2	
103-FRR-005	USA GROUND OPERATIONS	STATUS THE RESULT OF THE INVESTIGATION OF THE MISSING 1/4" RATCHET AND RESOLUTION TO ANY PAYLOAD CUSTOMER CONCERNS.		STS-103 PMMT	
103-FRR-006	MOD	DEVELOP A PLAN WITH PAYLOAD CUSTOMER ON RESOLUTION OR WORKAROUND FOR SLUGGISH POCC THROUGHPUT COMMANDING AND POCC COMMAND SENT TWICE/TWO STAGE COMMAND FAILURE.		STS-103 PMMT	

C - CONSTRAINT TO MILESTONE

STS-103
DELTA FLIGHT READINESS REVIEW
December 1, 1999
ACTION ITEM LOG

CONTROL NO.	ASSIGNEE(S)	ACTION	C	DUE DATE	CLOSURE DATE
103-DFRR-001	USA GROUND OPERATIONS	PROVIDE SPECIFICATIONS FOR WIPERS UTILIZED IN GROUND OPERATIONS TO ALL PROGRAM ELEMENTS FOR VERIFICATION THAT WIPERS MEET FLIGHT HARDWARE CLEANLINESS/ CONTAMINATION REQUIREMENTS.		STS-103 PMMT	
103-DFRR-002	MOD	DEVELOP PLAN TO RESOLVE MCC SOFTWARE COMMANDING ISSUES.		STS-99 FRR	
103-DFRR-003	SPACE SHUTTLE PROGRAM	PROGRAM TO READDRESS SELECTION OF TAL VERSUS RTLS IN FIRST STAGE.		STS-103 PMMT	

C - CONSTRAINT TO MILESTONE

CoFR EXCEPTION LOG

CoFR REVIEW DATE: 11-19-99

STS FLT NO. **STS-103**

REQUIREMENT/ EXCEPTION NUMBER	ELEMENT	DESCRIPTION OF EXCEPTION	DUE DATE
001	Payload HST	All payload processing flight and GSE related hardware and software IPR's, PR's, UA's, and other processing documentation are properly resolved, dispositioned, and approved. Lost and found problem reports LAF-3-27-0580, LAF-3-27-0581, and LAF-3-27-0582 initiated to document lost MLI buttons and 1/4" ratchet from the following locations and are not dispositioned: 1 MLI button missing from airlock blanket located on right side/ 1 MLI button missing X01307 bulkhead blandet approx. 12" below sill / 1 MLI button missing X01307 blanket from left side. Ratchet searched for in PCR and not found.	**11-19-99**
002	SRB	Hydraulic pump spring retainers may not be installed per vendor drawing. Test and analysis show alternate configuration is acceptable.	**12-06-99**
003	SSME	High pressure fuel turbopump turbine blade axial stop tab crack and lower firtree lobe cracks. UCR's (A034268 and A034269) are not closed/deferred for STS-103.	**103 PMMT**
004	SSME	Generic MR 1238688 pending approval on the high pressure fuel turbopump main housing backplate undersized wall.	**103 PMMT**

CoFR EXCEPTION LOG

CoFR REVIEW DATE: 11-19-99

STS FLT NO. **STS-103**

REQUIREMENT/ EXCEPTION NUMBER	ELEMENT	DESCRIPTION OF EXCEPTION	DUE DATE
005	FLIGHT SOFTWARE	08117, Section 8.5.18.1 b - SFOC Unique Responsibilites - Flight Software has been developed per released requirements, verified, and implemented to support the mission. Formal approval, generation, verification and release of an STS-103 software patch for CR 92467 - STS-103 HST Command Patch - is in work per Shuttle Program Manager direction on 11-17-99. Work is scheduled to be completed on 11-29-99.	**STS-103 PMMT**
006	Safety Tether SED 33105087-313	Endorsement: Acceptability of unexpained anomalies, problems and IFA's Exception: The Extended-Range crewmember (ERCM) safety tether manifested on STS-99 experienced a spring failure on 11/16/99. Results of the failure investigation and the resolution plan is forthcoming.	**STS-103 PMMT**